

What is claimed is:

- 1 1. A method of detecting intrusion in an area by analysis of a plurality of time-sequential
2 image frames from at least one image sensor, comprising the steps of:
 - 3 a) taking a current image frame;
 - 4 b) dividing the current image frame into a plurality of cell images, each cell
5 image being a portion of the current image comprising a plurality of
6 adjacent pixels;
 - 7 c) blurring the cell image;
 - 8 d) storing a value representing the blurred cell image in a stack of a
9 plurality of time-sequential cell values, incrementing the stack such
10 that an oldest cell value is lost when the value is added to the stack;
 - 11 e) computing a sliding average of the plurality of cell values in the stack;
 - 12 f) computing a difference between the cell value from the current image
13 and the sliding average;
 - 14 g) reporting a detection if the difference exceeds a defined lower threshold
15 or a defined upper threshold;
 - 16 h) repeating the method from step (a).
- 1 2. The method of claim 1 in which the images are taken using infrared.
- 1 3. The method of claim 1 in which the images are taken using visual light.
- 1 4. The method of claim 1 in which the blurring step comprises averaging an intensity
2 amplitude of the pixels in the sub-image.
- 1 5. The method of claim 1, further comprising sequential detection by the steps, after step
2 (g) of:
 - 3 g1) starting a count when a detection is first reported in step (g);

4 g2) incrementing the count each time another image is processed and the
5 detection remains reported;

6 g3) confirming the detection and setting a cell active condition when the
7 count exceeds a count threshold.

1 6. The method of claim 5, further comprising the step of resetting the cell active condition
2 and stopping the count when an opposite threshold is reached from the threshold
3 which caused the detection to be reported.

1 7. The method of claim 6 further comprising the step of estimating the time an intruder
2 remains in a cell from the count.

1 8. The method of claim 5, further comprising the step, if a detection is reported in step (g),
2 but after a selected time the count threshold is not exceeded, of searching adjacent
3 cells to determine if a detection has occurred, and confirming a detection if a
4 detection has occurred in an adjacent cell.

1 9. The method of claim 8, further comprising the steps of deriving an angular speed and
2 direction estimate from the relative direction of the adjacent cell, and predicting the
3 next likely detection cell.

1 10. The method of claim 1, further comprising the step of reporting the detection to a
2 central computer.

1 11. The method of claim 10, further comprising the step of the central computer raising an
2 intrusion alarm based on selected rules and the reported detections from a plurality
3 of image sensors.

1 12. The method of claim 11, in which the central computer confirms a detection by
2 detections from other image sensors having overlapping coverage.

1 13. The method of claim 12, further comprising the step of deriving an intruder position
2 from image data from at least two sensors having overlapping coverage.

- 1 14. The method of claim 10, further comprising the step of the central computer displaying
2 a map of the plurality of sensors, and when a detection occurs, putting an
3 indication on the map.
- 1 15. The method of claim 14, in which the indication is a strobe line indicating a bearing of
2 detection from the sensor at which the detection occurred.
- 1 16. The method of claim 1, in which selected cells are masked off and not processed, such
2 that reporting of detections due to known causes is inhibited.
- 1 17. The method of claim 1, further comprising the step of storing a plurality of images for
2 historical comparisons.
- 1 18. The method of claim 17, further comprising the step of displaying a the plurality of
2 images in time sequence upon detection of an intrusion, such that intruder
3 movement is shown.
- 1 19. The method of claim 1, further comprising the step of storing a record of detections.